DOE/ID-10929
Revision 0
March 2002

U.S. Department of Energy
Idaho Operations Office

Remedial Design/Remedial Action Work Plan for Waste Area Group 4, CFA-08 Sewage Plant Drainfield, OU 4-13

INEEL
Idaho National Engineering and Environmental Laboratory
Home of Science and Engineering Solutions

DOE/ID-10929
Revision 0

Remedial Design/Remedial Action Work Plan for Waste Area Group 4, CFA-08 Sewage Plant Drainfield, OU 4-13

Published March 2002

Prepared for the
U.S. Department of Energy
Idaho Operations Office

Remedial Design/Remedial Action Work Plan for Waste Area Group 4, CFA-08 Sewage Plant Drainfield, OU 4-13

DOE/ID-10929
Revision 0

March 2002

Approved by:

Stephen G. Wilkinson
WAG 4 Project Manager

3/28/02
Date

Doug Preussner
WAG 4 Project Engineer

3/28/02
Date

ABSTRACT

This report describes the remedial design/remedial action for the Central Facilities Area (CFA)-08 Sewage Plant Drainfield Comprehensive Environmental Response, Compensation, and Liability Act site. This response will mitigate the excess risk due to external exposure to Cs-137. The primary remedial action objective for the CFA-08 site is to prevent direct exposure to Cs-137 concentrations that would result in a total excess cancer risk greater than 1E-04. An engineered evapotranspiration cover will be constructed over the CFA-08 Sewage Treatment Plant Drainfield, and a fence will be placed around the toe of the cover. Institutional controls will be in effect for approximately 189 years.

CONTENTS

FIGURES

TABLES

ACRONYMS

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BBWI	Bechtel BWXT Idaho, LLC
BOR	Bureau of Reclamation
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
D&D	decontamination and dismantlement
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
EPA	Environmental Protection Agency
ER	Environmental Restoration
FFA/CO	Federal Facility Agreement and Consent Order
HASP	Health and Safety Plan
HWD	hazardous waste determination
IC	institutional control
IDAPA	Idaho Administrative Procedures Act
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
LDR	land disposal restriction
MCL	maximum contaminant level
MCP	management control procedure
NESHAP	National Emission Standards for Hazardous Air Pollutants
O&M	operations and maintenance

OU	operable unit
PCB	polychlorinated biphenyl
PLN	plan
RAO	remedial action objective
RCT	radiological control technician
RD/RA	remedial design/remedial action
RFP	Request for Proposal
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
RWMC	Radioactive Waste Management Complex
SOW	Scope of Work
STP	Sewage Treatment Plant
SVOC	semivolatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
TBC	to be considered
USGS	United States Geological Survey
VOC	volatile organic compound
WAG	waste area group

Remedial Design/Remedial Action Work Plan for Waste Area Group 4, CFA-08 Sewage Plant Drainfield, OU 4-13

1. INTRODUCTION

In accordance with the *Federal Facility Agreement and Consent Order* (FFA/CO) (Department of Energy Idaho Operations Office [DOE-ID] 1991) between the Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Idaho Department of Environmental Quality (IDEQ), hereafter referred to as the Agencies, DOE submits this Remedial Design/Remedial Action (RD/RA) Work Plan for the Central Facilities Area (CFA). Under the current remediation management strategy outlined in the FFA/CO, the location identified for the remedial action is designated as Waste Area Group (WAG) 4, Operable Unit (OU) 4-13 at the Idaho National Engineering and Environmental Laboratory (INEEL).

The OU 4-13 remedial action, as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 6901 et seq.) process, will proceed in accordance with the signed Record of Decision (ROD) for CFA (DOE-ID 2000a). The ROD presents the selected action for 52 sites evaluated under the WAG 4 Comprehensive Remedial Investigation/Feasibility Study (RI/FS) (DOE-ID 2000b).

The ROD provides information to support remedial actions for three sites where contamination presents an unacceptable risk to human health and the environment. The three sites requiring remedial action under the OU 4-13 ROD include:

- CFA-04 Pond
- CFA-08 Sewage Plant Drainfield
- CFA-10 Transformer Yard.

A "No Action" decision was made for the remaining 45 sites, as it was determined that they did not present unacceptable risks. The remedial action at the CFA-04 Pond is scheduled to begin in 2003, and the CFA-10 Transformer Yard remedial action began and was completed in 2001. This work plan details the remedial action associated with the construction of an engineered evapotranspiration cover over the CFA-08 Sewage Plant Drainfield designed to protect the public and workers from direct exposure to Cs-137 contamination.

The OU 4-13, CFA-08 RD/RA Work Plan addresses the operations and maintenance including institutional controls at CFA-01 (Landfill I), CFA-02 (Landfill II), CFA-03 (Landfill III), CFA-07, and CFA-08 (DOE-ID 2001). Periodic radiological environmental monitoring is also addressed in the OU 4-13, CFA-08 RD/RA Work Plan. The OU 4-13 Operations and Maintenance (O&M) Plan details the operations and maintenance, institutional controls, and periodic environmental monitoring for these sites (DOE-ID 2002).

Nitrate concentrations exceeding the 10-mg/L maximum contaminant level (MCL) were identified in two groundwater-monitoring wells near CFA. Nitrate concentrations will be monitored and evaluated in conjunction with the long-term groundwater monitoring conducted under the OU 4-12 Post-ROD Monitoring Work Plan (INEEL 1997).

1.1 Work Plan Organization

This work plan outlines the major activities to be completed in implementing the remedial action for the CFA-08 site in accordance with the ROD (DOE-ID 2000a). The work plan describes the site, contaminants of concern, applicable or relevant and appropriate requirements (ARARs), project management, tasks, schedules, and cost estimates. The following are brief descriptions of the work plan's sections and appendices:

- Section 1 describes the background and history of WAG 4 and provides an overview of the selected remedy for the CFA-08 site.
- Section 2 provides the remedial design criteria, including the design codes and standards, assumptions, and quality assurance.
- Section 3 discusses the remedial design of the project. A summary of the required activities is presented.
- Section 4 is the evaluation of the CFA-08 site including an evaluation of the potential risks to human health and the environment. Descriptions of existing site conditions, potential migration and exposure pathways, and an assessment of exposure routes are provided. Also, the remedial action objectives (RAOs) and ARARs are discussed in this section.
- Section 5 outlines the CFA-08 Sewage Plant Drainfield Remedial Action Work Plan. This section includes the necessary steps and documentation required for completing the remedial action, as described in Sections 1 through 4. The required work tasks, project cost estimates, inspections, subcontractor requirements, and environmental and safety plans are discussed in this section.
- Section 6 describes the necessary actions involved for each 5-year review to occur after the remedial action has taken place.
- Section 7 is a listing of the references.
- Appendix A, Design Drawings, contains drawings that detail the present conditions (e.g., topography and fencing) at the site, as well as the work to be performed during the remedial action.
- Appendix B, Construction Specifications, contains the technical specifications that provide the general terms and conditions required for completion of the remedial action.
- Appendix C, Erosion and Runoff Calculations, provides numerical values for the ability of the cover to resist significant erosion and run-off during rainfall and wind events.
- Appendix D, Infiltration Calculations, shows that the cover will significantly reduce meteorological infiltration within the drainfield.
- Appendix E, Air Emissions Modeling Results, presents a summary of the results of the air emissions to satisfy project ARARs.
- Appendix F, Waste Management Plan, describes the management and disposal of wastes generated during remedial activities.

- Appendix G, Cost Estimate, provides the cost estimate, basis for the estimate, and related assumptions.
- Appendix H contains the environmental checklist.
- Appendix I contains the archaeological clearance recommendation.
- Appendix J contains the ordnance survey clearance
- Appendix K, CFA nitrate evaluation
- Appendix L contains the Safety Category List and the Safety Category Designation and Record.

In addition, three separate documents have been prepared for OU 4-13. Specifically, the Health and Safety Plan (HASP) (INEEL 2001) describes the possible hazards and the required actions to protect the health and safety of workers, and the Hazard Classification evaluates the hazards associated with the CFA-08 remedial action work tasks and assigns a hazard classification in accordance with established criteria. Long-term operations and maintenance activities that will be conducted, and institutional control requirements that will be implemented at WAG 4 sites are detailed in the OU 4-13 Operations and Maintenance Plan (DOE-ID 2002).

1.2 Background

Located 51 km (32 mi) west of Idaho Falls, Idaho, the INEEL is a government-owned/contractor-operated facility managed by the DOE-ID (Figure 1-1). Occupying 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain, the INEEL encompasses portions of five Idaho counties: (1) Butte, (2) Jefferson, (3) Bonneville, (4) Clark, and (5) Bingham.

Waste Area Group 4 is designated as one of 10 WAGs located at the INEEL and is composed of the area known as the CFA (Figure 1-1). The CFA has been used since 1949 to house many of the support services for all of the operations at the site including laboratories, security, fire protection, medical, communication systems, warehouses, cafeteria, vehicle and equipment pools, bus system, and laundry facilities. The original buildings at CFA, built in the 1940s and 1950s, housed Navy gunnery range personnel, administration, shops, and warehouse space. The facilities have been modified over the years to fit changing needs and now provide four major types of functional space: (1) crafts, (2) office, (3) service, and (4) laboratory.

1.2.1 CFA-08 Sewage Plant Drainfield

The Navy first operated a sewage treatment facility at CFA from 1944 through 1953. This system consisted of a septic tank (CFA-716), a sludge drying bed, and two distribution areas. In 1953, a new system was constructed that utilized the original septic tank, a new sludge drying bed, and an expanded drainfield with additional distribution areas, trickling filters, digesters, and two clarifiers. This system operated, with some modifications, until February 1995. It received effluent from sewage waste lines from chemical laboratories, craft shops, warehouses, photographic services, vehicle services, a medical dispensary, a maintenance repair shop, and laundry facilities that processed low-level radiologically contaminated clothing. Average flow through the sewage treatment facility ranged between 416,350 L/day (110,000 gal/day) to 662,375 L/day (175,000 gal/day) (INEL 1995).

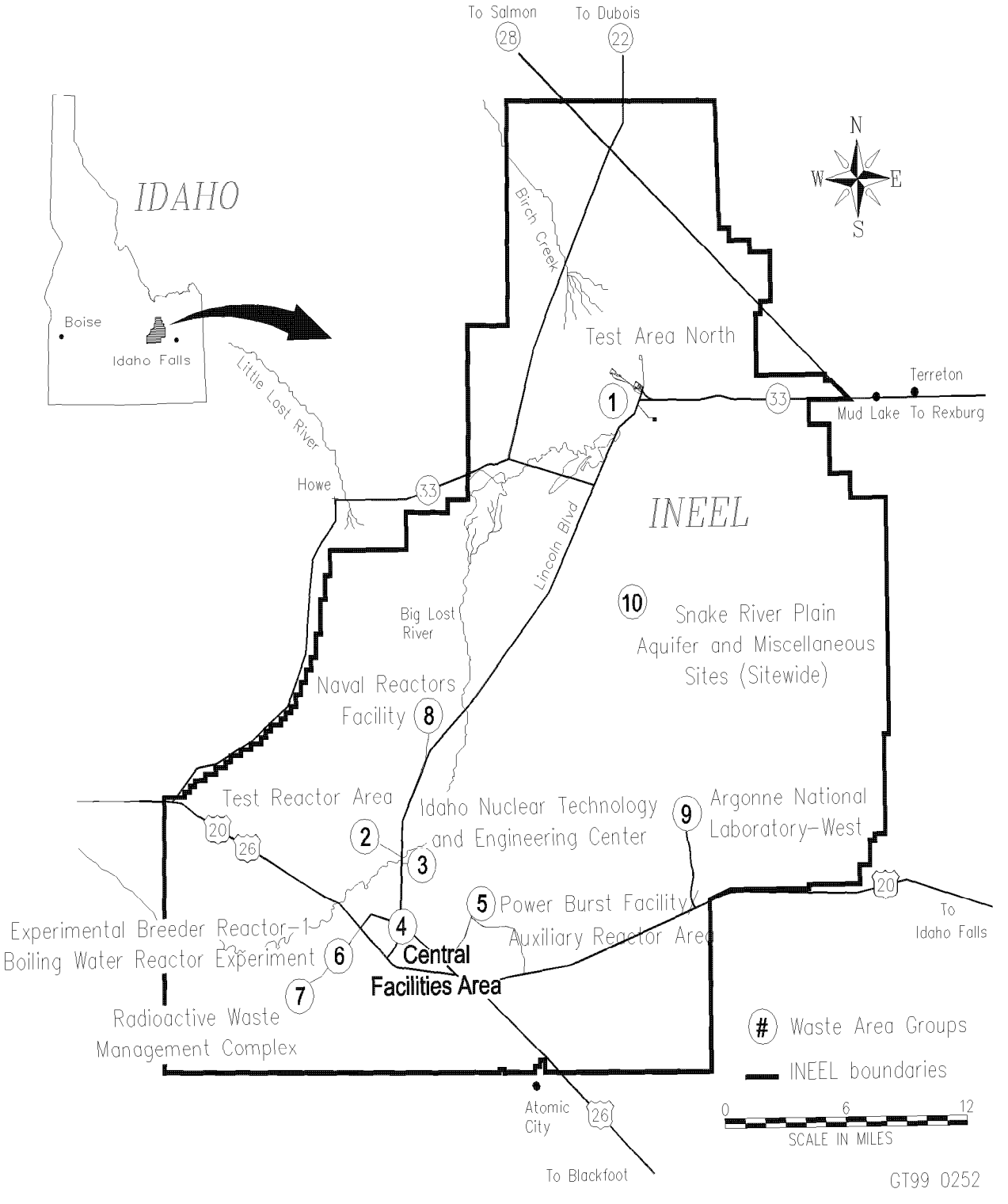

Figure 1-1. Location of the Idaho National Engineering and Environmental Laboratory.

The CFA-08 site actually comprises three components in the FFA/CO (DOE-ID 1991): (1) the sewage plant building (CFA-691), (2) the septic tank (CFA-716) inside the sewage plant, and (3) the drainfield. Potential releases from the sewage plant, the septic tank, and associated piping were investigated during decontamination and dismantlement (D&D) activities that commenced in 1996. Those data were evaluated in the Baseline Risk Assessment (BRA) portion of the OU 4-13 RI/FS (DOE-ID 2000b). The BRA concluded that concentrations of metals, radionuclides, herbicides, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs) at the sewage plant and the pipeline between the sewage plant and drainfield do not pose an unacceptable risk to human health and the environment. Those portions of the CFA-08 site require no further action.

The CFA-08 drainfield is approximately 61 × 305 m (200 × 1,000 ft) with linear trenches that are approximately 1.8 m (6 ft) deep (Figure 1-2). It contains five distribution areas—each with 20 concrete drain pipes approximately 1.1 m (3.5 ft) below ground surface (bgs). The distribution pipes are surrounded by screened gravel in linear trenches 0.76 m (2.5 ft) wide, 1.8 m (6 ft) deep, and 61 m (200 ft) long. Basalt bedrock is encountered between 6.1 m (20 ft) and 9.8 m (32 ft) bgs in the vicinity of the drainfield. A sedimentary interbed was encountered at a depth of approximately 31.1 m (102 ft) bgs in two borings drilled adjacent to the drainfield (INEL 1995).

1.3 Selected Remedy

Based on consideration of the requirements of CERCLA, the detailed analysis of alternatives, and public comments, the Agencies have selected containment as the remedy for the CFA-08 Sewage Plant Drainfield. Performance standards will be implemented as design criteria for the site to ensure that the selected remedy protects human health and the environment. Institutional controls will be maintained, and 5-year reviews will be used to ensure that the selected remedy remains protective and appropriate.

The selected remedy most cost effectively meets the threshold and balancing criteria of the three alternatives considered. Under this remedy, the contaminated site will be covered with an engineered protective cover. This cover will be an engineered barrier, constructed of layers of rock and soil with a vegetative cover. The cover has been designed to isolate low-level radioactive contaminants from human and biotic intrusion and to provide radiation shielding for a period of 189 years. The following remedial action will be performed at the site:

- Constructing an engineered evapotranspiration cover. Clean native soil will be used for fill material, as needed.
- Contouring and grading the surrounding terrain to direct the surface water run-off away from the cover.

The continued effectiveness of this remedy will be evaluated through soil cover integrity monitoring and aboveground radiological surveys. Because contamination is to be left in place, institutional controls (ICs) are necessary for CFA-08 to restrict access until the land can be released for unrestricted use. Institutional controls to be implemented at CFA-08 include:

- Restricting access through the use of fences, signs, and permanent markers
- Controlling land use leasing and property transfers
- Establishing and publishing surveyed boundaries
- Controlling activities on the land.

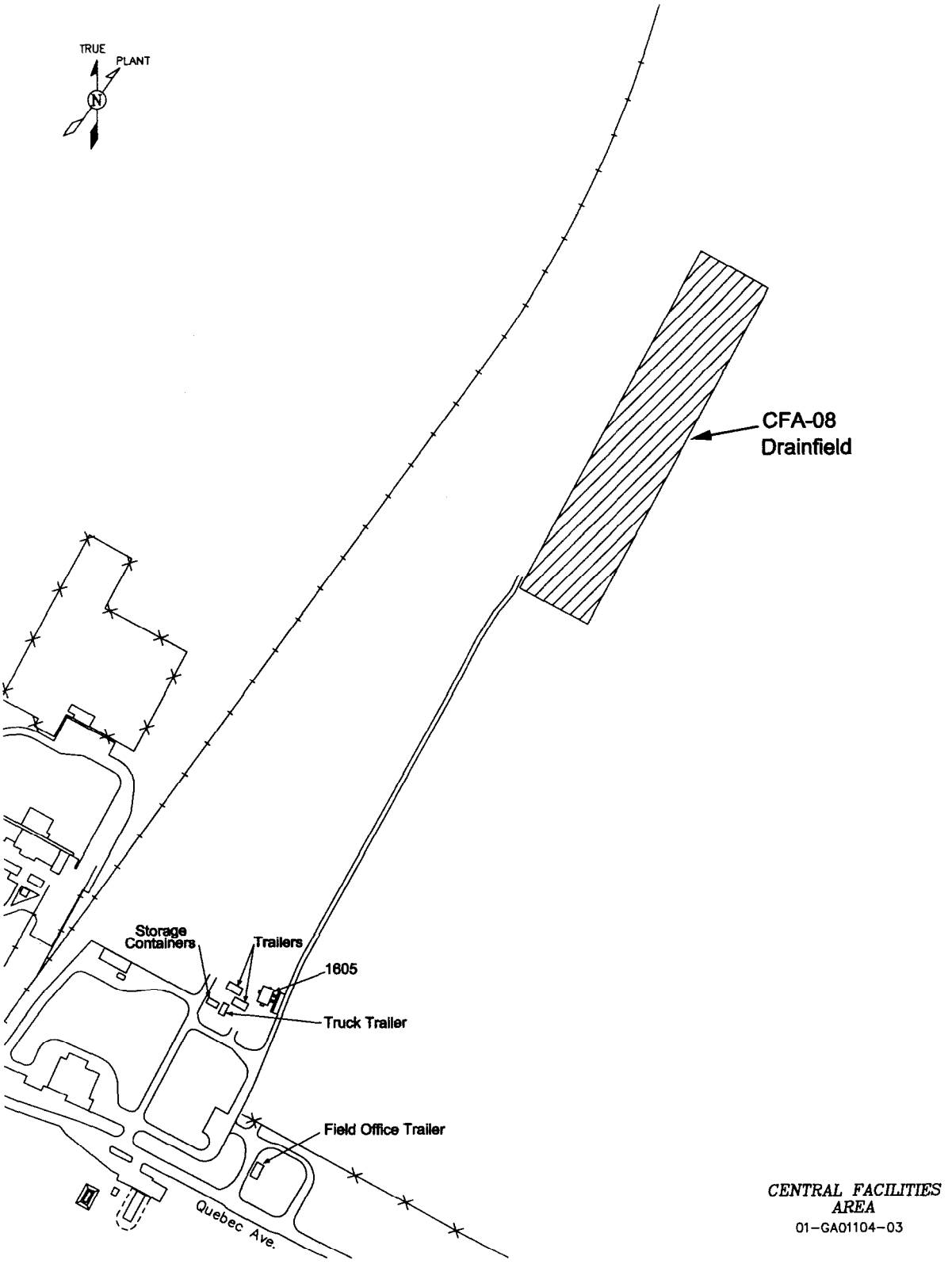

Figure 1-2. Location of CFA-08 drainfield at the Central Facilities Area.

1.3.1 Waste Area Group 4 Institutional Controls

Institutional controls or land use restrictions will be maintained by DOE at any INEEL CERCLA site where residual contamination precludes unrestricted land use, as required by EPA Region 10 policy (EPA 1999). Long-term ICs are planned for five CFA sites: the CFA-08 Sewage Plant Drainfield; CFA Landfills I, II, and III (OU 4-12); and the CFA-07 French Drain. The Sewage Plant Drainfield will require ICs because of the residual risk from Cs-137 that will remain at the site. Institutional controls were identified as part of the selected remedy for the landfills in the OU 4-12 ROD to ensure that future activities would not compromise the integrity of the covers (DOE-ID 1995). The CFA-07 French Drain has residual lead contamination above the 400-mg/kg screening level, below 3 m (10 ft). A detailed discussion of the IC evaluation and implementation for WAG 4 is provided in the O&M Plan (DOE-ID 2001b).

2. DESIGN BASIS

2.1 General Description of Project Components

The project components (support facilities, electrical power, and project execution services) are described in the following subsections.

2.1.1 Support Facilities

The support facilities to be used during field operations include a field office trailer, parking area, and equipment staging and material laydown areas. Currently, a field office trailer is located approximately 0.4 km (0.25 mi) south of the drainfield area for use by contractor personnel (see Figure 1-2). The subcontractor may provide their own support trailer, with space for the trailer provided by the contractor.

2.1.2 Electrical Power

Electrical power is available near the CFA-08 site for subcontractor use.

2.1.3 Project Execution Services

Project execution services (ensuring design specifications are met, reviewing and improving construction interface documents, etc.) will be provided by Bechtel BWXT Idaho, LLC (BBWI) on an as-needed basis. In addition, engineering support will be provided during preconstruction, construction, and construction closeout. BBWI personnel will review and address construction interface documents and review vendor data submittals for completeness.

2.2 Design Criteria

2.2.1 INEEL Management Control Procedures

The project definition, project planning, project execution, and project acceptance and closeout phases will be performed in compliance with pertinent BBWI internal company procedures. The pertinent management control procedures (MCPs) for this project are those identifying requirements in the following areas:

- Engineering Design
- Emergency Preparedness and Management
- Environmental Management
- Fire Protection
- Management Systems
- Occupational Safety and Health
- Radiological Protection
- Security

- Environmental Restoration
- Waste Management
- Conduct of Operations
- Conduct of Maintenance
- Quality.

2.2.2 CFA-08 Sewage Plant Drainfield Remedial Design Performance Standards

The design criteria for the containment system will be implemented to ensure that the cover provides protection to the public against direct exposure to Cs-137 and contains the contamination until the excess risk to human health posed by Cs-137 is below 1×10^{-4}. A time period of 189 years is required for the maximum Cs-137 concentration (180 pCi/g) at the CFA-08 drainfield to decay to 2.3 pCi/g, which is the 1×10^{-4} future residential risk-based concentration for free-release of the site. The engineered containment was selected based on the results of the comparative analysis of alternatives. It is the least costly alternative that meets the threshold criteria (i.e., the remedy provides overall protection of human health and the environment and satisfies ARARs) and is easily implemented due to the availability of materials and technology at the INEEL. The short-term effectiveness is moderate due to potential worker exposure during placement of the cover layers; however, exposure will be minimized due to the shielding effects of the different cover layers. The long-term effectiveness is high, because the cover integrity needs to be maintained for a relatively short period of time (i.e., 189 years) due to the radioactive decay of Cs-137. The estimated period of time required to complete the remedial action at CFA-08 is 5 months.

Table 2-1 details the design basis data used in the design of the CFA-08 engineered barrier.

The following activities will be conducted to complete remediation of the CFA-08 Sewage Plant Drainfield:

- Removal of existing fencing.
- Abandonment of one interbed/monitoring well (IB-1) and two shallow monitoring wells (DA-1 and DA-4).
- Demolition and in-place abandonment of the five distribution boxes.
- Reduction of the volume of existing vegetation on the drainfield and toe area of the cover by mowing.
- Excavation, hauling, and placement of earthen materials comprising the cover.
- Vegetation of the cover and revegetation of all areas affected by the project activities with the exception of the access roads to the drainfield and CFA borrow source. The access roads will remain in place.
- Installation of a chain-link fence around the drainfield and placement of signs and permanent markers.

Table 2-1. Required design basis information for the engineered barrier at CFA-08.

Design Basis Data	Rationale	Required Value
Design Life	Establish period of required performance. Important parameter for all engineering calculations.	Design life should be a minimum of 189 years.[a]
Institutional Life	Establish period of required performance. Important parameter for O&M Plan.	Institutional life should be a minimum of 189 years.[b]
Acceptable Erosion Rate	Required for erosion calculations and for determining cover layer thickness.	Two tons per acre per year, upper limit (EPA 1989).
Design Basis Wind Speed	Required for erosion calculations and for determining cover layer thickness.	This is not applicable since minimal wind erosion has occurred at the INEEL over the past 10,000 years (Keck 1995).
Design Basis Precipitation Event	Required for erosion calculations and for determining cover layer thickness.	100-year, 6-hour storm event.
Slope	Run-off control	0.5% Slope on the cover. Slope on the toe shall be 10H:1V or flatter.
Site Topographical Information	Establishes grade, cut and fill volumes, and drainage characteristics.	Topographic surveys will be performed. See current surveyed topography in Drawing C-1.
Seismic Zone	Required for geometrical analysis of slope stability and subsidence.	This is not applicable since the engineered cover is classified as Performance Category 0 (PC = 0) per DOE Standard 1021.
Frost Depth	May impact total cover thickness.	Approximately 0.9 m (3 ft).

a. See ROD, Table 9-1 (DOE-ID 2000a). Calculated from a reference date of 1998 when the OU 4-13 Baseline Risk Assessment was completed; therefore, the design life of the cover should last until at least the year 2187.

b. Institutional life is specified in the ROD (DOE-ID 2000a) and includes operation and maintenance of completed remedial actions. The institutional life is anticipated to be at least 189 years, or until the year 2187, based on a reference date of 1998 when the OU 4-13 Baseline Risk Assessment was completed. Final determination will be made by review of the remedy no less than every 5 years, until determined unnecessary by the Agencies during a 5-year review.

2.3 DOE Related Codes, Standards, and Documents

The following DOE-related codes, standards, and documents will be used as the basis for the remediation of CFA-08:

- *Final Comprehensive Record of Decision for Central Facilities Area, Operable Unit 4-13* (DOE-ID 2000a)

- DOE Order 231.1, "Environment, Safety, and Health Reporting"
- DOE Order 232.1A, "Occurrence Reporting and Processing of Operations Information"
- DOE Order 414.1, "Quality Assurance"
- DOE Order 435.1, Chapter IV, "Radioactive Waste Management"
- DOE Order 440.1A, "Worker Protection Management for DOE Federal and Contractor Employees"
- DOE Order 470.1, "Safeguards and Security Program"
- DOE Order 5400.5, "Radiation Protection of the Public and the Environment"
- DOE Order 5480.4, "Environmental Protection, Safety, and Health Protection Standards"
- 10 Code of Federal Regulations (CFR) 830.120, "Quality Assurance Requirements"
- 10 CFR 835, "Occupational Radiation Protection."

2.4 Engineering Standards

Appendix B contains references to the latest engineering standards and the specification to which they apply.

2.5 Environmental and Safety

The following is a list of potential action-specific, chemical-specific, and location-specific ARARs identified in the ROD (DOE-ID 2000a). A detailed discussion of the ARARs is presented in Section 4.

Action-Specific ARARs:

- 40 CFR 61.92, "National Emissions Standards for Hazardous Air Pollutants—Standard"
- 40 CFR 61.93, "National Emissions Standards for Hazardous Air Pollutants—Emission Monitoring and Test Procedures"
- Idaho Administrative Procedures Act (IDAPA) 58.01.01.585, "Toxic Air Pollutants Non-Carcinogenic Increments"
- IDAPA 58.01.01.586, "Toxic Air Pollutants Carcinogenic Increments"
- IDAPA 58.01.01.650 and .651, "Fugitive Dust"
- IDAPA 58.01.05.006, "Hazardous Waste Determination"
- IDAPA 58.01.05.008 (40 CFR 264), "Standard for Owners and Operators of the Hazardous Waste Treatment, Storage, and Disposal Facilities"

- IDAPA 58.01.05.011 (40 CFR 268), "Land Disposal Restrictions"
- IDAPA 58.01.05.011 (40 CFR 268.49), "Alternative LDR Treatment Standards for Contaminated Soils"
- 40 CFR 122.26, "Stormwater Discharge Requirements"
- 40 CFR 264.310 (a) (1–5), "Closure and Post Closure Care of Landfills."

Chemical-Specific ARARs:

- IDAPA 58.01.05.005 (40 CFR 261.20 through .24), "Hazardous Waste Characteristics Identification."

Location-Specific ARARs:

- 16 USC 4691.2, "Historic Properties Owned or Controlled by Federal Agencies"
- 36 CFR 800.4, "Identification of Historic Properties"
- 36 CFR 800.5, "Assessment of Adverse Effects"
- 25 USC 3002 (43 CFR 10.6), "Custody"
- 25 USC 3005 (43 CFR 10.10), "Repatriation."

2.6 Design Assumptions

The assumptions under which the RD/RA activities will be performed for the remediation of the CFA-08 Sewage Plant Drainfield are as follows:

- Clean native loam soil and pit run gravel will be available from on-Site borrow sources, including the Lincoln Boulevard pit, Spreading Area A, and the CFA gravel pit; other cover construction materials will be obtained from an approved off-Site vendor.
- Institutional controls will be required at the CFA-08 Sewage Plant Drainfield site for 189 years, unless otherwise documented in a 5-year review.
- The cap construction will isolate and prevent direct exposure to the Cs-137 contamination that would result in a total excess cancer risk greater than 1 in 10,000.

In addition to the above assumptions, which were listed in the Scope of Work (SOW), the following assumption has also been incorporated into the RD/RA for the CFA-08 Sewage Plant Drainfield. The ROD discusses the CFA-08 site as having two no action portions—the Sewage Treatment Plant (STP) and the pipeline—and one remedial action portion, which is the Sewage Plant Drainfield (DOE-ID 2000a). The pipeline between the STP and the drainfield was evaluated for risk and determined to require no further action. The piping system from the STP to the CFA-08 fence was removed by INEEL D&D personnel during the D&D of the STP that occurred between May 1999 to July 2000. However, the removal was not completed to the distribution boxes, because the necessary authorization and work control documents were not in place at that time. Removal of the remaining piping system was planned to be completed during the CFA-08 remedial action as a best management practice to ensure it is

not in the way of any future construction activities that might take place outside the completed CFA-08 cover; however, the design of the cover is such that the toe of the cover will extend completely over the piping and distribution boxes. As such, they will be within the new fence and protected cover slopes and will be part of the institutionally controlled area, thereby alleviating the best management practice concerns and any need to remove them. Additionally, to avoid interference with construction of the cover and eliminate the possibility of subsidence, the abovegrade portion of the distribution boxes will be collapsed and filled with gravel or other structurally suitable material. The piping and distribution boxes will then be included within the toe of the CFA-08 cover and the new site fence.

2.7 Unresolved Issues

There are no unresolved issues related to the remedial design or remedial action of the CFA-08 Sewage Plant Drainfield.

2.8 Quality Assurance

A safety category has been assigned to the RD/RA of the CFA-08 Sewage Plant Drainfield in accordance with MCP-540, "Documenting the Safety Category of Structures, Systems and Components." A "Consumer Grade" safety category has been deemed appropriate for this project; as such, all design, procurement, and field operations activities will be conducted in accordance with the "Consumer Grade" safety category designation. Appendix L contains the Safety Category List and Safety Category Designation and Record.

Plan (PLN)-694, "Environmental Restoration Project Management Plan," and the "Project Execution Plan for Waste Area Group 4" (PLN-808) have been adopted for this project and are incorporated by reference. The guidance governs the functional activities, organization, and quality assurance/quality control protocols that will be used for this project.

Where applicable, the project specifications (Appendix B) will specify the quality assurance/quality control procedures for the given task, consistent with the guidance provided by the Project Management Plan (PLN-694), the Project Execution Plan (PLN-808), and the "Consumer Grade" safety category designation.

3. REMEDIAL DESIGN

3.1 Project Site

This section describes the remedial design for the CFA-08 Sewage Plant Drainfield, which was developed in accordance with the engineering design criteria presented in Section 2. The civil design drawings and specifications for the action are included in Appendices A and B, respectively. The following sections summarize the major aspects critical to the remedial design.

3.2 CFA-08 Sewage Plant Drainfield Contaminant Summary

The CFA-08 STP was used to treat and dispose of CFA process wastewater from 1953 to 1995. The original system, installed by the Navy in 1944, handled wastewater until 1953. The Navy plant is presumed to have handled only sanitary wastewater until 1950 when the hot laundry was built and began discharging wastewater directly into the STP. Effluent from the STP was subsequently discharged to the CFA-08 Sewage Plant Drainfield.

Perched water zones were created by drainfield operations and were present as recently as 1995; however, they are now dry. The perched water zones were investigated as part of the Track 2 investigation conducted in 1995. Two interbed boreholes were completed on the west and east sides of the drainfield, IB-1 and IB-2, respectively. Perched water was encountered in IB-1 at a depth of 31.3 m (102.7 ft); therefore, it was completed as a perched water monitoring well. No perched water was encountered in IB-2, which was drilled to a total depth of 45.7 m (150 ft); therefore, the hole was abandoned and backfilled (INEL 1995). Additionally, five shallow boreholes (DA-1 through DA-5) were drilled inside the drainfield from ground surface to the soil/basalt interface. Perched water was encountered in DA-1 and DA-4, and these were completed as perched water monitoring wells.

The CFA-08 drainfield, abandoned Navy drying beds, perched water in sedimentary interbeds below and adjacent to the drainfield, and surface soils downwind of the CFA-08 sewer system and drainfield were evaluated in the OU 4-08 Track 2 investigation in 1994 (INEL 1995). Samples collected from the drainfield as part of the OU 4-08 Track 2 investigation were analyzed for radionuclides, metals, VOCs, SVOCs, PCBs, pesticides, and herbicides. Analytical results indicated the presence of radionuclides, metals, VOCs, and SVOCs in the drainfield soils. Perched water sample analyses indicated that metals and radionuclides were present. The concentrations of trace metals—arsenic and barium—were below the MCLs. Radionuclides detected in the perched water samples included Am-241, Cs-137, H-3, Pu-238, Pu-239/240, Sr-90, U-234, and U-238. Sr-90 was detected in all samples above the 8-pCi/L MCL. Total uranium (U-234, U-235, and U-238) concentrations exceeded background concentrations. Tritium (H-3) concentrations were below MCLs in all perched water samples. Am-241, Cs-137, Pu-238, and Pu-239/240 were detected at shallow depths below the drainfield (5.5 to 8.8 m [18 to 29 ft]).

The human health risk assessment performed at the CFA-08 drainfield identified unacceptable excess risk, greater than 1×10^{-4}, for external exposure to radiation from Cs-137 for current and future workers and for future residents. Groundwater risks were evaluated for contaminants of concern identified in the OU 4-13 RI/FS. The GWSCREEN modeling results indicated that WAG 4 does not contain sources of contamination that have the potential to produce risk greater than 1×10^{-4} (DOE-ID 2000b).

3.3 Site Preparation

Plot plans delineating the laydown and stockpile areas will be prepared prior to field activities. The areas directly associated with the placement of the engineered cover at the CFA-08 drainfield will require preparation prior to construction of the cover. The following general site-preparation activities will be accomplished before construction of the cover, and any special requirements are stated as notes on the design drawings:

- Abandon one interbed (IB-1) and two shallow (DA-1 and DA-4) perched water monitoring wells in accordance with the IDAPA
- Remove two telephone poles (out-of-service) (cut off flush with the ground)
- Remove chain link fencing and cut posts off flush with the ground in accordance with Specification 02444, "Chain Link Fencing," provided in Appendix B
- Remove the radiological control fencing under the direction of radiological control
- Demolish abovegrade distribution boxes and abandon in place by filling with earthen materials
- Establish vertical control, set slope stakes, and set grade-finishing stakes in accordance with Specification 01051, "Construction Surveying and Staking," provided in Appendix B
- Mow the vegetation within the bounds of the drainfield and on the toe area of the cover in accordance with Specification 02200, "Earthwork," provided in Appendix B
- Compact the drainfield and toe area of the cover in accordance with Specification 02200, "Earthwork," provided in Appendix B.

3.4 Earthwork

Earthwork activities include, but are not limited to, mowing vegetation, dust control, placing and compacting earthen cover layers, and finish grading and grading for surface drainage. All earthwork activities associated with construction of the engineered cover at the CFA-08 Sewage Plant Drainfield—including activities at the Lincoln Boulevard, CFA, and Spreading Area A borrow sources—will be graded to encourage drainage away from the cover or excavations. All areas that are disturbed by the earthwork activities (except the CFA gravel pit) will be revegetated per Specification 02486, "Revegetation," located in Appendix B. Additionally, activities conducted at the Spreading Area A borrow source will follow the requirements listed in Section 4.3 of this document. The existing gravel access road to the CFA-08 Sewage Plant Drainfield will remain in place after the remedial action is complete.

The configuration of the engineered cover used in the CFA-08 Sewage Plant Drainfield design is based on studies previously conducted by the Environmental Science and Research Foundation and currently conducted by the Stellar Corporation. While these studies have primarily been directed at eliminating precipitation pathways to buried waste by prohibiting insects and small mammals from penetrating the barrier, they have also proven effective against insects, small mammals, and vegetation bringing contaminated materials to the surface. The results of these studies suggest that an effective barrier may consist of four layers (from the surface down):

Layer 1: 1.2 m (4.0 ft) of native soil loam material. This layer represents an optimum mix of soil texture, soil thickness, and vegetation cover with adequate soil-water storage capacity to retain any infiltrated water until it can be removed through evapotranspiration.

Layer 2: 0.1 m (0.33 ft) of pea gravel having a graduation ranging from the No. 8 sieve to 1.9 cm (3/4 in.) diameter. This layer functions as a filter from the native loam material above. The filtration requirements were necessary to ensure that two different adjoining soil layers do not mix because there is no geotextile placed between them.

Layer 3: 0.3 m (1.0 ft) of cobbles having a graduation ranging from 5 to 15 cm (2 to 6 in.) in diameter. This layer functions as both a capillary and bio-intrusion barrier. The capillary barrier design utilizes the differences in pore-size distributions and the corresponding differences in capillary (suction) forces, under unsaturated conditions, to retain water in the upper soil layer. The bio-intrusion barrier (consisting of the pea gravel and cobble layers) restricts burrowing mammals and plant root growth to soils above the intrusion barrier.

Layer 4: pit run gravel (depth varies). This layer functions as a readily available material to establish the grade for constructing the 0.5% sloped crown in the cover.

3.5 Surface Water and Erosion Protection

The effects of surface water and erosion upon the engineered cover were evaluated with respect to the remedial design. The design of the cover is such that the native soil layer will reduce infiltration into the drainfield by intercepting the precipitation and making it available for evapotranspiration. Infiltration calculation results are presented in Appendix D.

The native soil cover, comprising the uppermost portion of the cover, will be vegetated following *Guidelines for Vegetation of Disturbed Sites at the INEL* (DOE-ID 1989) in accordance with Specification 02486, "Revegetation," provided in Appendix B. The native soil cover should experience minimal erosion over the design life, based on the soil types and the vegetation. The soil cover will be sloped abovegrade to divert surface water and minimize erosion. Erosion calculations were prepared based on the design of the cover and are presented in Appendix C.

3.6 Task Site Staging

A laydown and stockpile area will be necessary to stage equipment and materials close to the work. The staging area will be located so that noncontaminated materials and equipment operate in work areas isolated from contaminated materials and equipment. A temporary decontamination area for personnel and equipment decontamination will be established at the control point in accordance with the decontamination requirements of the project HASP (INEEL 2001). Spill prevention and control will be maintained for the staging area. The staging area was selected based upon several factors including meteorological data to ensure that the laydown and stockpile area would not be located in an area downwind of the prevalent wind direction at the task site. Radiological control considerations, available infrastructure (i.e., power), and the topography of the site were among other considerations made in selecting the staging area. The combination of these criteria forms the basis for selection of the staging areas.

4. HUMAN HEALTH AND ENVIRONMENTAL COMPLIANCE

4.1 Remedial Action Objectives

The RAOs for CFA-08, OU 4-13, were developed in accordance with the *National Oil and Hazardous Substances Contingency Plan* (EPA 1990) and refined through discussions between the Agencies. The RAOs are based on the results of the human health and ecological risk assessments, as outlined in the ROD (DOE-ID 2000a). The intent of the RAOs is to set goals for the protection of human health and the environment.

The following land-use assumptions were used in the development of the RAOs for the CFA-08 remediation:

- CFA will serve as the primary area at the INEEL for technical service and support functions until the year 2095, with access restrictions and other administrative and physical security controls.
- Land use controls will be used to restrict access to the CFA-08 Drainfield area until the year 2187.

The following RAOs were developed to protect human health and the environment for the CFA-08 Sewage Plant Drainfield:

- Prevent direct human exposure to Cs-137 that would result in total excess cancer risk greater than 1 in 10,000.
- Prevent ingestion and inhalation of Cs-137 that would result in a total excess cancer risk greater than 1 in 10,000 or a total hazard index greater than 1.0.
- Prevent exposure of ecological receptors to contaminated soil with concentrations greater than or equal to a screening level of 10 times background values that result in a hazard quotient greater than or equal to 10.
- Monitor the groundwater at WAG 4 until the nitrate level falls below the 10-mg/L MCL.

4.2 Applicable or Relevant and Appropriate Requirements

Table 4-1 summarizes how the substantive requirements of the ARARs and to be considered (TBC) requirements for the CFA-08 Sewage Plant Drainfield have been addressed by the remedial design or will be addressed during the remedial action. Use of air monitoring and/or dust suppression techniques during earthwork activities (including borrow, haul, and stockpiling of materials and placement of the cover layers) will ensure compliance with emission ARARs. The site has been surveyed previously for cultural resources (Appendix I), and appropriate actions will be taken to satisfy ARARs for protection of sensitive resources. If cultural resources are encountered, the requirements delineated in the *INEEL Management Plan for Cultural Resources* (DOE-ID 2000c) will be involved. The DOE Order 5400.5 TBC will be met through administrative and engineering controls to limit exposures to ionizing radiation to allowable levels.

Table 4-1. Compliance with ARARs and TBCs for the CFA-08 Sewage Plant Drainfield.

Category	Citation	Relevancy	Compliance Strategy
Action-Specific ARARs			
Rules for the Control of Air Pollution in Idaho			
Toxic Air Emissions (IDAPA 58.01.01.585 and .586)	The release of carcinogenic and noncarcinogenic contaminants into the air must be estimated before the start of construction, controlled, and monitored during excavation of soil.	A	Carcinogenic and noncarcinogenic contaminants will not be released into the air.
Fugitive Dust (IDAPA 58.01.01.650 and .651)	The control of dust is required at all times, especially during disturbance and placement of existing vegetation and topsoil.	A	Dust suppression measures will be applied, where required, during the remedial action to minimize the generation of fugitive dust. These measures may include water sprays, commercial dust suppressants, tarps or covers, minimizing vehicle speeds, and cessation of work during periods of high winds (>30 mph).
National Emission Standards for Hazardous Air Pollutants (NESHAP)			
Radionuclide Emissions from DOE Facilities (40 CFR 61.92)	Limits exposure of radioactive contamination release to 10 mrem/year for the off-Site receptor.	A	Releases of radiological contaminants into the air from this site are addressed in Appendix E. Radionuclide emission calculations and air modeling have been completed and are presented in Appendix E. Results of the modeling estimated a 6.5E-07 mrem/yr dose at the site boundary. The calculated emissions will be included in the INEEL Annual NESHAP Report.
Emission Monitoring (40 CFR 61.93)	Establishes monitoring and compliance requirements.	A	Air emissions have been modeled (see Appendix E). Modeled emissions are well below 10% of minimum effective dose equivalent for point source emissions monitoring.

Table 4-1. (continued).

Category	Citation	Relevancy	Compliance Strategy
Resource Conservation and Recovery Act—Standards Applicable to Generators of Hazardous Waste			
Hazardous Waste Determination (IDAPA 58.01.05.006)	A hazardous waste determination is required for all soils and secondary wastes generated during remediation activities to ensure proper treatment and/or disposal methods are applied.	A	Secondary wastes generated during the construction of the engineering cover will be evaluated through a hazardous waste determination (HWD) to ensure proper handling and disposal.
Temporary Units (IDAPA 58.01.05.008) (40 CFR 264.553)	A temporary tank or storage container may be used to treat or store hazardous remediation wastes on the contiguous property for a period of no longer than one year.	NA	No hazardous wastes exist or will be generated during the construction of the engineering cover that requires the use of a temporary storage unit; therein, compliance with these requirements is not applicable or relevant and appropriate.
Remediation Waste Staging Piles (IDAPA 58.01.05.008) (40 CFR 264.554)	The accumulation of solid, non-flowing remediation waste on the contiguous property must facilitate a reliable, effective, and protective remedy; be designed to prevent or minimize the release of hazardous wastes; and must not operate for a period of longer than two years.	NA	No hazardous wastes exist or will be generated during the construction of the engineering cover that would require the use of staging piles; therein, compliance with these requirements is not applicable or relevant and appropriate.
Storm Water Discharges during Construction (40 CFR 122.26)	A National Pollutant Discharge Elimination System Permit must be obtained for the performance of construction activities to minimize, control, and monitor the discharge of storm water.	NA	The cover construction site lies outside of the boundaries of the storm water corridor at the site; therein, compliance with these requirements is not applicable or relevant and appropriate. Construction material borrow sources are addressed under separate Storm Water Pollution Prevention Plans.
Closure and Post Closure Care of Landfills 40 CFR 264.310(a)(1–5)	At completion, the cover must be designed and constructed to provide long-term minimization of migration of liquids, function with minimum maintenance, promote drainage and minimize erosion, and accommodate settling and possess the permeability less than or equal to the natural sub-soils present.	NA	The identified area of contamination does not and will not contain hazardous wastes following the completion of construction of the engineering cover; therein, compliance with these requirements is not applicable or relevant and appropriate.
Land Disposal Restrictions (LDRs) (IDAPA 58.01.05.011) (40 CFR 268)	All hazardous wastes must be treated to meet specific concentration levels prior to land disposal.	NA	No hazardous wastes exist or will be generated during the construction of the engineering cover, which would trigger LDRs; therein, compliance with these requirements is not applicable or relevant and appropriate.

Table 4-1. (continued).

Category	Citation	Relevancy	Compliance Strategy
Alternative LDR Treatment Standards for Contaminated Soils (IDAPA 58.01.05.011) (40 CFR 268.49)	All soils containing hazardous wastes must be treated to meet specific concentration levels prior to land disposal.	NA	No soils containing hazardous wastes exist or will be generated during the construction of the engineering cover, which would trigger LDRs for soil; therein, compliance with these requirements is not applicable or relevant and appropriate.
Chemical-Specific ARARs			
Identification and Listing of Hazardous Waste			
Hazardous Waste Characteristics Identification (IDAPA 58.01.05.005) (40 CFR 261.20–24)	Requires that solid waste not exempt from regulation as a hazardous waste must be evaluated to determine if it exhibits any of the characteristics of a hazardous waste.	A	Secondary wastes generated during the construction of the engineering cover will be evaluated under an HWD to determine proper treatment, storage, and/or disposal paths identified.
Location-Specific ARARs			
National Historic Preservation Act			
Historic Properties owned or controlled by Federal Agencies (16 USC 4691.2)	The site must be surveyed for cultural and archeological resources before construction commences, and appropriate actions must be taken to protect any sensitive resources.	A	A cultural and archeological resource investigation was performed. Summaries of the investigation results are provided in Appendix I. The results of the investigation show that there are no cultural or archeological resources within the site. Stop work authority would be invoked in the unlikely event that cultural artifacts are encountered.
Identifying Historic Properties (36 CFR 800.4)	A review of existing information on historic properties within the area of potential affects, including historic properties not yet identified, must be performed.	A	A historical background investigation was performed. A summary of the results is provided in Appendix I. No properties of historical significance were identified within the site.
Assessing Effects (36 CFR 800.5)	The adverse effect of an undertaking that may alter, directly or indirectly, any of the characteristics of any property identified and meeting the criteria for inclusion in the National Register of Historic Places.	A	A historical background investigation was performed. A summary of the results is provided in Appendix I. No properties of historical significance were identified within the site.

Table 4-1. (continued).

Category	Citation	Relevancy	Compliance Strategy
Native American Graves Protection and Repatriation Act			
Custody (25 USC 3002)	The site must be surveyed for cultural and archeological resources prior to construction and for appropriate actions taken to protect any sensitive resources.	A	A cultural and archeological resource investigation was performed. Summaries of the investigation results are provided in Appendix I. The results of the investigation show that there are no cultural or archeological resources within the site. In the event that human remains or other items are unexpectedly discovered during work, stop work authority will be invoked.
Repatriation (25 USC 3005) (43 CFR 10.10)	Any discovered human remains and/or associated or unassociated funerary objects must be repatriated within 90 days of receipt of request from a representative of lineal descent.	A	A cultural and archeological resource investigation was performed. Summaries of the investigation results are provided in Appendix I. The results of the investigation show that there are no cultural or archeological resources within the site. Repatriation would be pursued in the unlikely event that anything is discovered.
To-be-considered (TBC) guidance			
Radiation Protection of the Public and the Environment			
(DOE Order 5400.5, Chapter II [1][a,b])	Limits the effective dose to the public from exposure to radiation sources and airborne releases.	B	Requirement will be met by administrative and engineering controls during the disturbance of the existing vegetation and soil cover at the drainfield site, construction of the cover, and by revegetating the area following construction of the engineered cover. Job Safety Analyses and/or Radiological Work Permits will be prepared for tasks where potential exposures to radioactive contamination/materials exist. Radiological Work Permits will only be used as determined by the radiological control technician, based on the "INEEL Radiological Control Manual" (PRD-183).

a. Relevancy:
A = Applicable
B = TBCs are not classified as applicable or relevant and appropriate.
NA – Not Applicable or Relevant

4.3 Spreading Area A Borrow and Reclamation Requirements

It is currently the determination of the U.S. Army Corps of Engineers that the Big Lost River, Birch Creek, and their tributaries are "Waters of the U.S." In accordance with Section C, Paragraph 7.7 of the FFA/CO, the remedial action at the CFA-08 drainfield is exempt from the procedural requirement to obtain federal, state, or local permits as these activities will be conducted entirely inside the boundaries of the INEEL in compliance with Section 121 of CERCLA, 42 USC 9621. Earthwork activities to be conducted at the Spreading Area A borrow source as part of this CERCLA remedial action will be completed in accordance with the substantive requirements of Section 404 of the Clean Water Act and per Specification 02200, "Earthwork," and Specification 02486, "Revegetation," located in Appendix B of this plan. Spreading Area A earthwork activities include, but are not limited to, excavation and transport of borrow material, dust control, and finish grading and revegetation for surface drainage and reclamation.

5. REMEDIAL ACTION WORK PLAN

The work plan details the management approach to the remedial action, including the schedule, and the necessary steps and documentation to perform the remedial action and document its completion. This section describes the elements necessary to implement the remedial design outlined in Sections 1 through 4. Because the remedial design and the remedial action work plan are combined into one document, some details of implementation have been described in the design portion of this document for clarity.

5.1 Relevant Changes to the Scope of Work

There are no changes to the WAG 4, OU 4-13 SOW (DOE-ID 2000d).

5.2 Assumptions and Unresolved Issues

Sections 2 and 3 of the SOW (DOE-ID 2000d) describe the assumptions associated with this project. Section 2.6 of this work plan describes the assumptions associated with the remedial design, and as stated in Section 2.7, there are no unresolved issues associated with the remedial action.

5.3 Work Tasks

For the purposes of this work plan, "contractor" refers to BBWI. "Subcontractor" means the business entity contracted to provide the materials, supplies, and/or services discussed herein. The following sections summarize the primary work tasks critical to the CFA-08 Sewage Plant Drainfield remedial action.

5.3.1 Premobilization

The subcontractor shall provide the contractor with all required submittals, work plans, bonds, and insurance. The subcontractor will verify that all remedial activity personnel working under contract for the subcontractor will be familiar with the relevant provisions of the project HASP (INEEL 2001). The subcontractor will provide the contractor with documentation confirming that all project personnel working for or through the subcontractor have received the necessary training and completed the medical examination requirements. This requirement must be fulfilled before the subcontractor is allowed to mobilize. The submitted documentation will demonstrate/certify that the subcontractor can meet and satisfy the requirements of the work plan and the project design. Prior to construction of the cap and removal of borrow material from Spreading Area A, a noxious weed control plan will be prepared and approved to mitigate the spread of noxious weeds as identified in the Environmental Checklist provided in Appendix H of this document.

Prior to the start of construction activities, and in accordance with the Environmental Checklist provided in Appendix H of this document, a biological survey of Spreading Area A will be performed to identify any active sage grouse nesting activities for work that may be conducted between March 15 and June 15. Activities conducted in Spreading Area A between March 15 and June 15 will be restricted to occurring after 10:00 a.m. and before 5:00 p.m.

5.3.2 Mobilization

Mobilization refers to the work the subcontractor must perform in preparation for field operations. This work generally consists of implementation of required administrative, engineering, and health and safety controls including, but not limited to, the following:

- Assembling the project work team and conducting the prejob briefing(s) specific to the remedial action tasks. Specific elements of the prejob briefing will include identifying work to be performed, hazards associated with the tasks, and the steps taken to mitigate the hazards to enable safe completion of the work.

- Delivery and storage of material and equipment.

- Setup of the field operations site offices (contractor and subcontractor).

- Identification and demarcation of the work areas including installation of temporary barriers and signs.

5.3.3 Fence and Pole Removal

The existing chain link fence shall be removed. The fabric and other recyclable fencing materials including rails and braces will be removed and set aside for possible reuse or excess after cover construction and vegetation. The fence posts will be cut off flush with the land surface and sent to the CFA landfill for disposal.

The radiological control fencing surrounding the drainfield, which designates the boundary of the soil contamination area, will be removed under the direction of the project radiological control technician (RCT). The wire strands will be removed and surveyed for radiological contamination. The T-bar posts shall also be removed and surveyed for radiological contamination. If contamination is found on the wire and/or posts, then that material will be dispositioned at the Radioactive Waste Management Complex (RWMC). If the wire or posts survey clean, then they will be dispositioned at the CFA landfill.

Two telephone poles located within the bounds of the drainfield will also require removal. The final disposition of the telephone poles will be determined pending the radiological survey and hazardous waste determination. The telephone poles will be cut off flush with land surface and surveyed for radiological contamination. If the poles are not radiologically contaminated, they will be delivered to the CFA excess yard; however, if radiological contamination is found, or if they are unusable, they will be dispositioned at the RWMC. If disposal is required at an off-INEEL Treatment, Storage, and Disposal Facility, then a CERCLA offsite suitability determination will be required.

5.3.4 Well Abandonment

Three perched water monitoring wells will be abandoned during this remedial action. The wells—IB-1, DA-1, and DA-4—were originally installed in support of the preliminary scoping Track 2 investigation of the CFA-08 Sewage Plant Drainfield (INEL 1995). These wells were completed into the perched water zones that were present below the drainfield. However, they have been dry since drainfield use was discontinued in 1995. As a result, these wells have not been identified for any future monitoring and will be abandoned by cutting the well casing at ground surface and filling the entire casing with bentonite and/or concrete containing as much as 5% bentonite. The wells will be abandoned in accordance with IDAPA 37.03.09.025.12.a, following MCP-3480, "Environmental Instruction for Facilities, Processes, Materials, and Equipment."

The location of a fourth, abandoned, perched water monitoring well (IB-2) is marked with a concrete pad and brass marker. This well was drilled in support of the preliminary scoping Track 2 investigation (INEL 1995). There was no water encountered during the drilling of IB-2; therefore, it was abandoned in place by filling the well with a grout mixture of 95% Portland cement and 5% bentonite

(INEL 1994). The location of the marker will be surveyed, and coordinate information will be placed in the project file.

Prior to any well abandonment activities, the Environmental Monitoring and Water Resources Group Comprehensive Well Survey Program Manager will be notified. Prior to abandonment, the locations of these wells will be surveyed and the coordinates will be sent to the Environmental Restoration (ER) project manager. After abandonment, the location of the well, designation of the well, and abandonment materials will be submitted to the ER project manager, who will then submit this information to Environmental Affairs and the Hydrogeological Data Repository for update to the Comprehensive Well Survey Database.

5.3.5 Distribution Box Abandonment

The five distribution boxes at the CFA-08 Sewage Plant Drainfield will be abandoned in place in accordance with the IDAPA. The aboveground concrete structures will be collapsed into each distribution box, and the balance will be filled and compacted with suitable, clean earthen material from an approved borrow source as designated on the design drawings provided in Appendix A, and specified in Appendix B, Specification 02200, "Earthwork."

5.3.6 Mowing the Site

The drainfield area and all areas to be occupied by the toe of the engineered cover plus 0.9 m (3 ft) outside the toe area (as indicated on the design drawings in Appendix A) shall be mowed, mulched (if deemed necessary by the contractor), and the cuttings will remain in place. Mowing operations will be performed in accordance with Specification 02200, "Earthwork," provided in Appendix B of this work plan.

Mowing operations will be limited to the areas designated on the design drawings, those areas required for barrier construction, or as directed by INEEL project personnel. Any areas outside the designated areas that are damaged or disturbed by field operations will be repaired and reseeded by the subcontractor in accordance with Specification 02486, "Revegetation," provided in Appendix B of this work plan.

5.3.7 Cover Base Preparation

Prior to placement of the pit run gravel, and after the site has been mowed as described in Section 5.3.6, the existing surface will be proof-rolled in accordance with Specification 02200, "Earthwork," provided in Appendix B of this work plan.

5.3.8 Earthwork

Earthwork associated with this project includes, but is not limited to, the following:

- Mowing vegetation, as required
- Controlling dust
- Excavating, hauling, stockpiling, placing, and compacting earthen materials
- Finish grading and grading for surface drainage.

The earthwork will include backfill and placement of gravels, cobble, and native loam soils for vegetation. All earthwork will be performed in accordance with the requirements of Specification 02200,

"Earthwork," provided in Appendix B and the project design drawings provided in Appendix A of this work plan.

5.3.9 Borrow, Haul, and Stockpile

Four types of borrow material are required for this project: (1) pit run gravel, (2) cobble, (3) pea gravel, and (4) native loam soil. The pit run gravel will be available on-Site from the CFA pit, or a designated on-Site alternate. The native loam soil will be available from the Lincoln Boulevard pit, Spreading Area A, or other designated on-Site alternates. All on-Site sources have been previously determined to be free of contamination. The cobble and pea gravel will be obtained by the subcontractor from an off-Site, commercial vendor.

Borrow operations will be performed in accordance with project Specification 02200, "Earthwork," provided in Appendix B of this work plan; an approved INEEL Form 450.19 "INEEL Gravel/Borrow Request Form;" and the requirements listed in Section 4.3 of this document. The subcontractor will set up an operation at the borrow area to gather and stockpile material in preparation for hauling it to the project site. The subcontractor will also set up a hauling operation to move the material from the borrow sources to the CFA-08 drainfield site where it will be stockpiled and placed.

Equipment used for the haul and stockpile operations will remain outside of radiologically controlled work areas. The work will require the services of heavy earthwork equipment (i.e., scrapers, dozers, loaders, and large dump trucks) and will require up-front planning and coordination with other Site operations and personnel to ensure safe and productive hauling across Site roads.

5.3.10 Dust Suppression

The subcontractor will minimize dust generation during earthwork activities in accordance with IDAPA 58.01.01.650 and .651 standards. This will be accomplished by the use of water trucks, visual observation, or covering of trucks used to haul borrow material. The subcontractor will limit the amount of water used so as not to create flowing water or overly moist loam-fill material. Water-based dust control additives may be used with the approval of the project manager.

5.3.11 Institutional Controls

Institutional controls will be set in place as part of the remedial action. A chain link fence with lockable, double swing gates will be erected around the perimeter of the cover, as indicated in the design drawings in Appendix A of this work plan and as detailed in Specification 02444, "Chain Link Fence," provided in Appendix B of this work plan. Permanent concrete markers will also be set in two places outside the perimeter fence. The permanent markers will contain brass plates indicating (at a minimum) the CERCLA site designation, site coordinates, type of contamination left in place, and the date of completion of the remedial action. Additionally, warning signs delineating the access restrictions will also be posted at all access points (gates) in the perimeter fence, as specified in the O&M Plan (DOE-ID 2001b).

5.3.12 Reclamation Seeding and Stabilization

Upon completion of cover construction, reclamation seeding will take place on the surface of the cover and the toe area of the cover. Areas adjacent to the cover, lay down areas, and all other areas affected by the CFA-08 remediation activities (such as material borrowing and stockpiling, except the CFA gravel pit) will also be reseeded. The seeding, fertilizing, and mulching of these sites will be performed following *Guidelines for Vegetation of Disturbed Sites at the INEL* (DOE-ID 1989) in accordance with the requirements set forth in Specification 02486, "Revegetation," provided in

Appendix B of this document. Reclamation activities at the Spreading Area A borrow source will also follow the requirements previously listed in Section 4.3 of this document.

The CFA gravel borrow source does not require revegetation; however, upon completion of borrow activities at this source, the Subcontractor shall grade and reshape the disturbed areas of the gravel pit in accordance with project Specification 02200, "Earthwork," provided in Appendix B of this work plan.

The existing access road to the CFA-08 Sewage Plant Drainfield will be maintained by the subcontractor. At the completion of the remedial action, the road will remain in place, allowing access to the site for the purposes of annual and 5-year inspections.

5.3.13 Demobilization

After the remedial action activities have been satisfactorily completed and all equipment has been properly decontaminated, task personnel will demobilize from the site, and the equipment will be removed from the site. Decontamination pads and temporary barriers and signs will be removed and dispositioned appropriately. In the event the equipment or materials cannot be decontaminated, it will be dispositioned at the RWMC as low-level radiological waste as specified in Appendix F, "Waste Management Plan," of this work plan.

5.4 Field Oversight/Construction Management

The DOE-ID remediation project manager will be responsible for notifying the EPA and IDEQ of project activities such as project startup, closeout, and inspections. Activities related to preliminary, prefinal, and final inspections are covered in Section 5.7. In accordance with the FFA/CO (DOE-ID 1991), notification will be provided to the EPA and IDEQ WAG managers a minimum of 14 calendar days prior to prefinal inspection activities.

The project manager will also serve as the single interface point for all routine contact between the Agencies and INEEL contractor representatives. Additionally, BBWI will provide field support services for field oversight; health and safety; and environmental, quality assurance, and landlord services for this project. An organization chart and position description are provided in the project HASP (INEEL 2001).

Visitors to the project site who wish to observe the remedial activities must meet badging and training requirements necessary to enter INEEL facilities. Training requirements for task site visitors are described in the project HASP (INEEL 2001).

5.5 Project Cost Estimate

The remedial action cost estimates for the tasks addressed by this work plan are presented in Appendix G, and the total project cost estimates are summarized in Table 5-1. Remedial action costs presented in this plan are less than those presented in the ROD for several reasons, specifically (1) the RD/RA document preparation is less because a sampling and analysis plan did not have to be prepared, (2) a geotextile layer and a perimeter drain system originally planned for in the ROD were not deemed to be necessary in the CFA-08 Sewage Plant Drainfield design presented in this plan, and (3) this cost estimate is based on 90% design and the contingency costs have been removed. The remedy, as set forth in the ROD, will be fully implemented at the lower cost.

5.6 Project Schedule

The schedule and schedule data for the CFA-08 Sewage Plant Drainfield RD/RA are presented in Figure 5-1. The schedule details all CFA-08 tasks identified in the OU 4-13 SOW (DOE-ID 2000d) through completion of the Construction Complete Report. Administrative document preparation activities

are based upon an 8-hour day, 5-day workweek; while field activities are based upon a 10-hour day, 4-day workweek. The schedule does not include any contingency for delay to the schedule because of late or slow document reviews, or for field activities experiencing loss of productivity due to adverse weather conditions or other causes outside of the control of the project team.

Table 5-1. Remedial action costs.

	ROD Cost Element, $K[a]	Updated Cost Element, $K
FFA/CO Management	435.8	435.8
RD/RA Document Preparation	378.1	269.0[b]
Site Characterization	345.8	112.5[c]
Remedial Action	5,400	1,399[d]
Total	6,560	2,206

a. Cost estimates from the ROD include 30% contingency and a factor of 1.0727 to convert from FY 1999 to FY 2001 dollars.

b. Actual costs plus estimates to complete.

c. Actual costs.

d. Values rounded from RD/RA cost estimate in Appendix G.

5.7 Inspections

Upon completion of remedial action construction activities, standard prefinal and final inspections will be performed at the CFA-08 site at the discretion of the project managers or designees. Periodic inspections can occur at any time during remedial activities. The inspections will be conducted to finalize all project work elements. The inspections will establish compliance with the remedial design, the activities outlined in the Remedial Action Work Plan, and with all project requirements.

Field quality control will be maintained by periodic inspections and tests as detailed in Specification 02200, "Earthwork," provided in Appendix B of this document.

5.7.1 Prefinal Inspection

Agency project managers or their designees will conduct the prefinal inspection prior to completion of the remediation. The DOE-ID will notify the Agencies approximately two weeks prior to the prefinal inspection date. The prefinal inspection will determine the status of remediation activities, including outstanding requirements and actions necessary to resolve any identified issues. All of the outstanding requirements, along with the actions required to resolve them, will be identified and approved by the Agencies during the prefinal inspection. The prefinal inspection report will document any unresolved items and the actions required for resolution.

5.7.2 Prefinal Inspection Report

Documentation of the prefinal inspection will be provided in a prefinal inspection report, which will contain the following elements:

- The names of all inspection participants
- Inspection checklist(s) containing specific project components requiring inspection to constitute acceptance of the remedial action

- A discussion of all documented inspection findings
- Corrective actions to be taken to correct deficiencies identified in the inspections, including acceptance criteria or standards, and planned dates for completion of the actions
- A date for the final inspection.

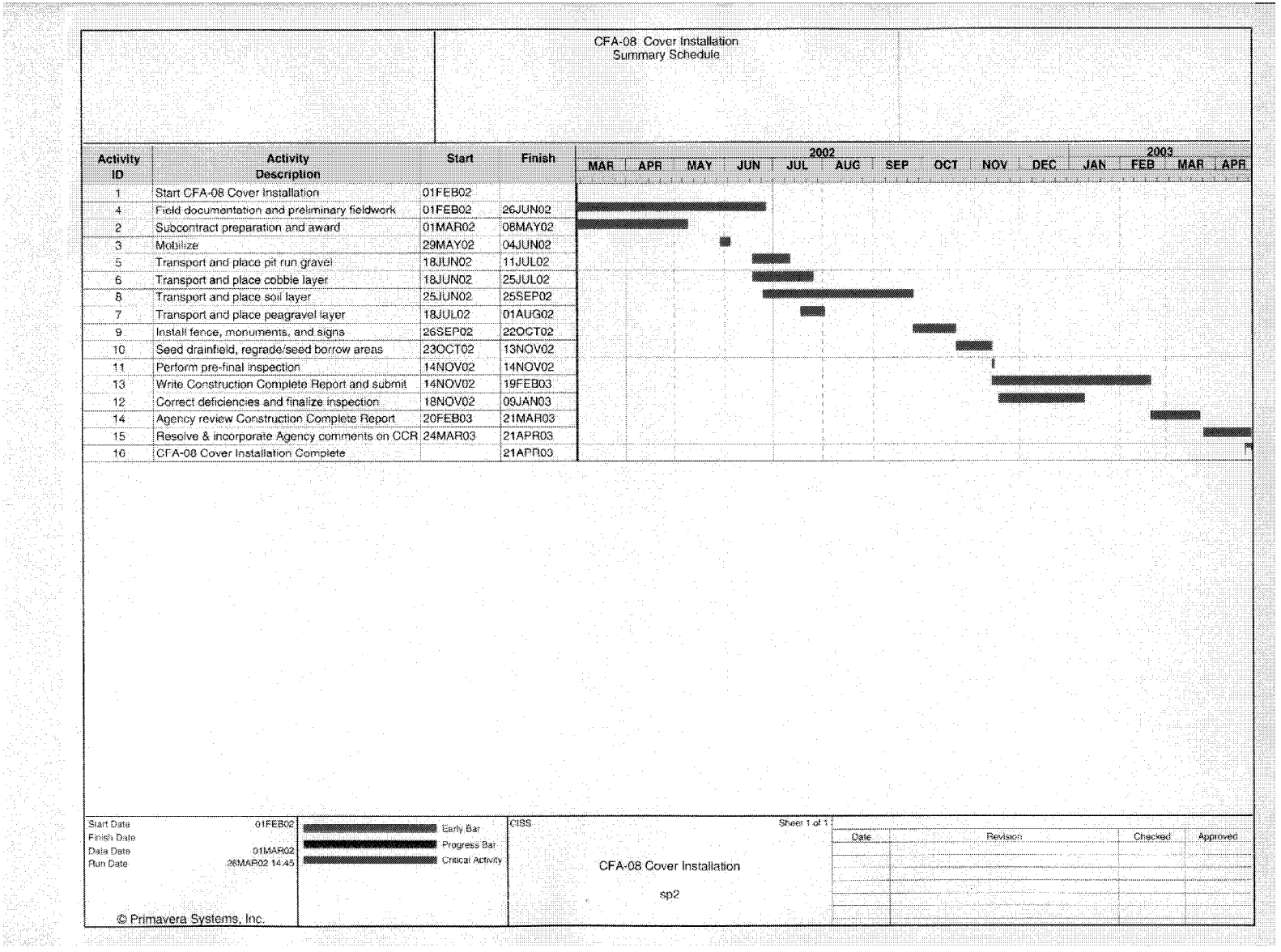

Figure 5-1. Cover installation schedule.

This report will be issued to document that the objectives of the OU 4-13 ROD (DOE-ID 2000a) for CFA-08 are being addressed. The prefinal inspection report will not be revised/finalized; however, the inspection will be finalized in the Construction Complete Report, documenting the prefinal inspection process. The completed prefinal inspection checklist may be included as an appendix to the Construction Complete Report and the Remedial Action Report in accordance with Section 8.4 of the FFA/CO (DOE-ID 1991). Submittal of the prefinal inspection report and the respective targeted schedule is identified in Section 5.6.

5.7.3 Final Inspection

The final inspection will be conducted following demobilization, after all excess materials and nonessential construction equipment have been removed from the sites, and the sites are considered functional and operational. Some equipment may remain onsite to correct items identified during final inspections. Final inspections, as conducted by the Agencies' project managers or their designees, will confirm the resolution of all outstanding items identified in the prefinal inspection and verify that the CFA-08 Sewage Plant Drainfield remedial action has been completed in accordance with the requirements of the OU 4-13 ROD (DOE-ID 2000a). Final inspections will be documented in the Construction Complete Report for CFA-08 and the final Remedial Action Report for OU 4-13.

5.8 QC Inspection Plan

Quality control inspection will be performed for this project. The tasks comprising this project will be subcontracted, in whole or in part, to a qualified subcontractor. The work performed by the subcontractor will be subject to periodic inspections by the contractor. The purpose and frequency of the inspections are included in Specification 02200, "Earthwork," in Appendix B.

5.9 Subcontracting Plan

The work comprising the remedial action of the CFA-08 Sewage Plant Drainfield is primarily earthwork, including the excavation, hauling, and placement of borrow materials to the project site, and the earthwork necessary to construct the engineered cover. Other activities included in this project are the removal and installation of fencing, removal of out-of-service telephone poles, demolition and in-place abandonment of five distribution boxes, well abandonment, installation of permanent markers and warning signs, and site reclamation activities. The specific tasks that will be performed to complete this work are described in Section 3.

The work, in total or in part, will be competitively bid to the lowest responsive qualified bidder, and a firm fixed-price contract with fixed-unit prices will be awarded. The bid process will include the Request for Proposal (RFP), prebid conference, private or public bid opening, bid evaluation, notice of award, notice to proceed, and the preconstruction conference. The RFP will specify, among other things, a strict period for performance that will correspond with the overall project schedule.

5.10 Health and Safety Plan

A site-specific HASP (INEEL 2001) has been prepared specifically for the tasks and conditions to be encountered on this project. This document is a living document and may be updated as conditions dictate. The plan covers the following items:

- Task-site responsibility
- Personnel training

- Occupational medical program and medical surveillance
- Accident prevention program
- Site control and security
- Hazard evaluation
- Personal protective equipment
- Decontamination
- Emergency response plan for the task site.

5.11 Waste Minimization Plan

Waste will be generated as a result of the activities conducted during this project. Wastes expected to be generated include the following:

- Personal protective equipment
- Equipment decontamination liquid residue
- Equipment decontamination solid residue
- Plastic sheeting
- Fencing materials (e.g., metal posts, wire, and chain link mesh)
- Wooden telephone poles
- Hydraulic spills
- Miscellaneous wastes.

Some wastes may be low-level radioactive; however, the CFA-08 Sewage Plant Drainfield does not contain any Resource Conservation and Recovery Act-listed or characteristic wastes, or Toxic Substances Control Act-regulated wastes. As the remediation commences, additional waste streams may be identified. All new projected waste streams, as well as those identified above, are required to have the waste identified and characterized. A hazardous waste determination must be completed and presented to the appropriate waste management organization (e.g., Waste Generator Services) for approval at the time of generation. A complete description of the wastes being generated and the appropriate disposition route is provided in Appendix F, "Waste Management Plan."

5.12 Storm Water Pollution Prevention Plan

Work activities at the CFA-08 Sewage Plant Drainfield lie outside the corridor of the Big Lost River System, and as such, a Storm Water Pollution Prevention Plan (SWPPP) is not necessary for the cover construction activities. The cover construction will require the use of approved on-INEEL borrow sources that may be within the corridor. Use of borrow material from these sources will require a SWPPP.

Addendum I to the *INEEL Storm Water Pollution Prevention Plan for Industrial Activities* (DOE-ID 2000e) addresses the SWPPP requirements for use of established borrow sources, as noted in the Environmental Checklist in Appendix H.

5.13 Work Within a Floodplain

For purposes of National Environmental Policy Act of 1969 compliance, DOE-ID has directed that all proposed actions are to be reviewed to identify their location relative to the elevation of the floodplain indicated by Koslow and Van Haaften (1986). This direction is considered to be interim and remains in effect until differences between methods of estimating Big Lost River flood elevations can be resolved to the satisfaction of the DOE-ID Natural Phenomenon Hazards Committee.

The existing drainfield elevation ranges from 1,500 m (4,921.3 ft) to 1,501 m (4,924.5 ft). The final elevation of the cover will be 1,502 m (4,928.67 ft), as indicated on the design drawings in Appendix A of this work plan. These elevations are below the 1,506-m (4,941-ft) peak water surface elevation indicated for Mackay Dam piping failure during a 100-year flood, as reported in Koslow and Van Haaften (1986). Thus, the potential for floodplain impacts with respect to the proposed drainfield cover within the maximum credible floodplain of the Big Lost River is considered in the Environmental Checklist, which is provided in Appendix H of this work plan. This determination considers both the effect of the drainfield cover on the floodplain as well as the effects of a potential flood on the cover.

Other studies by the United States Geological Survey (USGS) in 1998 (USGS 1998) and the Bureau of Reclamation (BOR) in 1999 (Ostenaa et al. 1999) evaluated the 100-year flood potential without Mackay Dam failure. The CFA-08 drainfield cover is not within the hypothetical 100-year floodplains described in the 1998 USGS or the 1999 BOR reports.

5.14 Decontamination Plan

Equipment decontamination will be conducted when deemed necessary by a RCT in the field. Decontamination operations will be performed in accordance with PRD-183, "INEEL Radiological Control Manual," in consultation with the project environmental affairs representative, as appropriate. As an exception to the decontamination procedures, isopropanol will not be used during decontamination, since organic contamination is not a concern.

Radiological contamination is the only potential contamination issue anticipated at the CFA-08 Sewage Plant remedial action site. Once the first layer of cover is in place, the contamination will be covered and any significant equipment decontamination is unlikely. In the event equipment becomes contaminated, dry decontamination procedures will be used at the beginning of the decontamination effort. If dry decontamination methods are not successful, then the equipment will be moved onto a clean decontamination pad or plastic where it will be decontaminated using a low-volume water spray from a portable unit. All equipment will be surveyed to verify that all contamination has been removed. If additional contamination is still evident, additional decontamination efforts will be conducted until the equipment is clean and may be free-released. The equipment will remain in the radiologically controlled area where remediation is being conducted until it is adequately decontaminated, as verified by a field radiation survey performed by the RCT. The following equipment may be required for decontamination:

- Decontamination pads or plastic sheeting (constructed to contain decontamination liquid) large enough to accommodate any equipment used in the contaminated area
- Brooms, wire brushes, putty knives, and other small equipment for removing contamination through dry methods

- Portable, low-volume, water-spray units (this equipment would only be used if dry decontamination was ineffective).

Management of wastes generated during decontamination efforts will remain within the area of contamination for temporary storage until final waste disposition. Similarly, tools used for decontamination (e.g., brushes and putty knives) will be decontaminated, surveyed for contamination, and released for reuse.

5.15 Spill Prevention/Response Plan

In the event of a spill, the emergency response plan (see Section 11 of the project HASP [INEEL 2001]) will be activated. All materials/substances on the work site will be stored in approved containers in accordance with the applicable regulations.

5.16 Operations and Maintenance Plan

The O&M Plan (DOE-ID 2001b) describes the long-term operations and maintenance activities that will be conducted at WAG 4, OU 4-13 to ensure that the selected remedies identified in the ROD (DOE-ID 2000a) remain protective of human health and the environment. The plan outlines the environmental monitoring requirements for WAG 4. The plan is a living document that will be revised, as necessary, to incorporate changes and additions identified during the implementation of the plan. Revisions to the O&M Plan may be made with concurrence from the Agencies.

The Institutional Control Plan is included as an appendix to the O&M Plan (DOE-ID 2001b) and outlines the institutional control requirements for CFA-01 (Landfill I), CFA-02 (Landfill II), CFA-03 (Landfill III), CFA-07, and CFA-08. The plan describes those items that will be included in the annual inspections. The extent of institutional controls at the CFA-08 Sewage Plant Drainfield site consists of permanent markers, warning signs, and fencing. These access restrictions will be maintained for a period of 189 years to inhibit intrusion into the buried waste, with the option to discontinue restrictions sooner based on the results of a 5-year review.

Land use will be restricted at CFA-01 Landfill I, CFA-02 Landfill II, and CFA-03 Landfill III; CFA-07 French Drains; and CFA-08 Sewage Plant Drainfield as prescribed in the ROD (DOE-ID 2000a). The CFA-01, CFA-02, and CFA-03 sites will be maintained with land use controls until evaluation during a 5-year review shows that institutional controls are no longer necessary. The OU 4-12 Post-ROD Monitoring Work Plan included a cost estimate for 30 years of groundwater monitoring at WAG 4; the wells have been monitored for five years to date and will continue to be monitored until such time as a 5-year review shows, and the Agencies agree, that it is no longer necessary. Land use at the CFA-07 French Drains is limited at depths greater than 3 m (10 ft) until otherwise documented in a 5-year review. Land use controls will be maintained for 189 years at the CFA-08 Sewage Plant Drainfield to inhibit intrusion into the subsurface waste remaining in place. Residential land use will be restricted until risk is less than 1E-04 or the site is released based on the results of a 5-year review.

The Institutional Controls Status Report (DOE-ID 2001a) was previously submitted to the Agencies in accordance with EPA Region 10 policy (EPA 1999). This report addresses the current status of institutional control measures as required by the OU 4-13 ROD (DOE-ID 2000a) and includes a record of recent inspections, site histories, brief profiles of contaminants, and summaries of future actions for OU 4-13.

5.17 Construction Complete Report

The CFA-08 Construction Complete Report will be prepared following demobilization and restoration of the disturbed areas and will be submitted to the Agencies. The Construction Complete Report will be used in preparation of the Remedial Action Report, which is a FFA/CO primary document that will be submitted following completion of the remedial action at CFA-04. The Construction Complete Report will include, but not be limited to, the following:

- Identification of the work defined in the CFA-08 work plan and certification that the work was performed.
- Explanation of any modifications to the CFA-08 work plan.
- Explanation of any modifications to the remedial design during the remedial action phase, including the basis and results of the modifications.
- Problems encountered during the remedial action and resolution to these problems.
- Any outstanding items from the prefinal inspection report that were identified and described.
- Certification that the remedy is operational and functional. DOE-ID will provide a statement certifying that the remedies are achieving, or have achieved, the requirements of the ROD (DOE-ID 2000a).
- As-built drawings showing final contours.
- Final, total costs of the CFA-08 remedial action.
- Results of the final inspection. Any final inspection will be documented in the draft Construction Complete Report, submitted to the Agencies' project managers, and used to resolve prefinal inspection issues.

6. FIVE-YEAR REVIEW

In accordance with the *National Oil and Hazardous Substances Contingency Plan* (EPA 1990), a review of the selected remedy will be conducted no less than every 5 years from the start of the remedial action at CFA-08 for sites where contamination above risk-based concentrations is left in place. The 5-year review will evaluate the remedy to determine if it remains protective of human health and the environment. The CFA landfills are scheduled for a 5-year review in 2002 under OU 4-12; as such, the three landfills will be rolled into the comprehensive WAG 4 5-year review with CFA-07 and CFA-08 in FY 2007 (2007 is five years after the start of remedial activities at CFA-08). Five-year reviews will be conducted by DOE for remediated sites with institutional controls at least until 2095 (i.e., until the 100-year institutional control period expires) or until it is determined during a 5-year review that institutional controls and 5-year reviews are no longer necessary. Specific to the CFA-08 sites, institutional controls will be maintained, and 5-year reviews will be conducted through the year 2187 (cover institutional and design life), or until it is determined during a 5-year review that institutional controls and 5-year reviews are no longer necessary.

7. REFERENCES

10 CFR 830.120, 2001, "Quality Assurance Requirements," *Code of Federal Regulations,* Office of the Federal Register, January 2001.

10 CFR 835, 2001, "Occupational Radiation Protection," *Code of Federal Regulations,* Office of the Federal Register, January 2001.

16 USC 4691.2, "Historic Properties Owned or Controlled by Federal Agencies," *United States Code.*

25 USC 3002 (43 CFR 10.6), "Custody," October 2000, *United States Code*.

25 USC 3005 (43 CFR 10.10), "Repatriation," October 2000, *United States Code*.

36 CFR 800.4, 2000, "Identification of Historic Properties," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

36 CFR 800.5, 2000, "Assessment of Adverse Effects," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 61.92, 2000, "National Emissions Standards for Hazardous Air Pollutants—Standard," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 61.93, 2000, "National Emissions Standards for Hazardous Air Pollutants—Emission Monitoring and Test Procedures," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 122.26, 2000, "Stormwater Discharge Requirements," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 261.20, 2001, "Identification and Listing of Hazardous Waste—General," *Code of Federal Regulations*, Office of the Federal Register, July 2001.

40 CFR 261.21, 2001, "Characteristic of Ignitability," *Code of Federal Regulations,* Office of the Federal Register, July 2001.

40 CFR 261.22, 2001, "Characteristic of Corrosivity," *Code of Federal Regulations,* Office of the Federal Register, July 2001.

40 CFR 261.23, 2001, "Characteristic of Reactivity," *Code of Federal Regulations,* Office of the Federal Register, July 2001.

40 CFR 261.24, 2001, "Toxicity Characteristics," *Code of Federal Regulations,* Office of the Federal Register, July 2001.

40 CFR 264.310 (a) (1–5), 2000, "Closure and Post Closure Care of Landfills," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 264.553, 2001, "Temporary Units," *Code of Federal Regulations,* Office of the Federal Register, July 2001.

40 CFR 264.554, 2001, "Staging Piles," *Code of Federal Regulations,* Office of the Federal Register, July 2001.

40 CFR 268, 2000, "Land Disposal Restrictions," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

40 CFR 268.48, 2000, "Universal Treatment Standards," *Code of Federal Regulations,* Office of the Federal Register, July 2000.

42 USC 6901 et seq., 1996, "Comprehensive Environmental Response, Compensation, and Liability Act of 1986 (CERCLA/Superfund)," *United States Code.*

DOE-ID, 1989, *Guidelines for Vegetation of Disturbed Sites at the INEL*, Department of Energy Idaho Operations Office, DOE/ID-12114, Revision 0, June 1989.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order*, U.S. Department of Energy Idaho Operations Office, Idaho Department of Health and Welfare, and U.S. Environmental Protection Agency, December 1991.

DOE-ID, 1995, *Record of Decision for Central Facilities Area Landfill I, II, and III Operable Unit 4-12 and No Action Sites (OU 4-13),* Department of Energy Idaho Operations Office, DOE/ID-10146, Rev. 0, October 1995.

DOE-ID, 2000a, *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13,* Department of Energy Idaho Operations Office, DOE/ID-10719, Rev. 2, July 1997.

DOE-ID, 2000b, *Comprehensive Remedial Investigation/Feasibility Study for Central Facilities Area Operable Unit 4-13 at the INEEL,* Department of Energy Idaho Operations Office, DOE/ID-10680, Rev. 1, July 2000.

DOE-ID, 2000c, *INEEL Management Plan for Cultural Resources,* Department of Energy Idaho Operations Office, 2000.

DOE-ID, 2000d, *CFA WAG 4 OU 4-13 Remedial Design/Remedial Action Scope of Work,* Department of Energy Idaho Operations Office, DOE/ID-10757, Rev. 0, October 2000.

DOE-ID 2000e, *Storm Water Pollution Prevention Plan for Industrial Activities,* Department of Energy Idaho Operations Office, 2000.

DOE-ID 2001, *Institutional Controls Status Report,* Department of Energy Idaho Operations Office, 2000.

DOE-ID, 2002, *Operations and Maintenance Plan for the Final Selected Remedies and Institutional Controls at Central Facilities Area, Operable Unit 4-13,* Idaho National Engineering and Environmental Laboratory, INEEL/EXT-01-01104, Rev. 0, March 2002.

DOE Order 231.1, 1996, "Environment, Safety, and Health Reporting," U.S. Department of Energy, November 7, 1995.

DOE Order 232.1A, 1997, "Occurrence Reporting and Processing of Operations Information," U.S. Department of Energy, July 21, 1997.

DOE Order 414.1, 2001, "Quality Assurance," U.S. Department of Energy, July 12, 2001.

DOE Order 435.1, Chapter IV, 2001, "Radioactive Waste Management," U.S. Department of Energy, August 28, 2001.

DOE Order 440.1A, 1997, "Worker Protection Management for DOE Federal and Contractor Employees," U.S. Department of Energy, July 10, 1997.

DOE Order 470.1, 1995, "Safeguards and Security Program," U.S. Department of Energy, September 28, 1995.

DOE Order 5400.5, 1993, "Radiation Protection of the Public and the Government," U.S. Department of Energy, January 7, 1993.

DOE Order 5480.4, 1993, "Environmental Protection, Safety, and Health Protection Standards," U.S. Department of Energy, January 7, 1993.

DOE-STD-1021-93, "Natural Phenomena Hazards Performance Categorization Guidelines for Structures, Systems, and Components," U.S. Department of Energy.

EPA, 1989, *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A),* U.S. Environmental Protection Agency, EPA/540/1-89/002, December 1989.

EPA, 1990, *National Oil and Hazardous Substances Contingency Plan*, Federal Register, Volume 55, U.S. Environmental Protection Agency.

EPA, 1999, Memorandum: "Region 10 Final Policy on Institutional Controls," Environmental Protection Agency.

IDAPA 37.03.09.12, 1993, "Abandoning of Wells," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, July 1, 1993.

IDAPA 58.01.01.585, 1995, "Toxic Air Pollutants Non-Carcinogenic Increments," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, June 30, 1995.

IDAPA 58.01.01.586, 1995, "Toxic Air Pollutants Carcinogenic Increments," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, June 30, 1995.

IDAPA 58.01.01.650, 1994, "Fugitive Dust," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, May 1, 1994.

IDAPA 58.01.01.651, 1994, "General Rules," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, May 1, 1994.

IDAPA 58.01.05.005 (40 CFR 261.20–.24), 2001, "Identification and Listing of Hazardous Waste," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, March 30, 2001.

IDAPA 58.01.05.006, 1994, "Standard Applicable to Generators of Hazardous Waste," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, May 1, 1994.

IDAPA 58.01.05.008, 2000, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Idaho Department of Health and Welfare, March 30, 2000.

IDAPA 58.01.05.011 (40 CFR 268), 2001, "Land Disposal Restrictions," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, March 30, 2001.

IDAPA 58.01.05.011 (40 CFR 268.49), 2001, "Alternative LDR Treatment Standards for Contaminated Soils," Idaho Administrative Procedures Act, Idaho Department of Health and Welfare, March 30, 2001.

INEEL, 1997, *Post-ROD Monitoring Work Plan for CFA Landfills I, II, and III, OU 4-12*, Idaho National Engineering and Environmental Laboratory, INEL-95/0579, Rev. 4, June 1997.

INEEL, 2001, *Health and Safety Plan Idaho National Engineering and Environmental Laboratory Central Facilities Area, Operable Unit 4-13 Drain Field (CFA-08) (Draft),* Idaho National Engineering and Environmental Laboratory, INEEL/EXT-01-01104, Revision A, September.

INEEL, Manual #14A, *Safety and Health Manual*, current issue.

INEL, 1995, *Preliminary Scoping Track 2 Summary Report for Central Facilities Area Operable Unit 4-08,* Idaho National Engineering Laboratory, INEL-95/0111, Revision 0, August 1995.

Keck, K. N., 1995, "SDA Surface Water Description and Data," EDF-ER-WAG7-66, EG&G Idaho, Inc.

Koslow, K. N. and D. H. Van Haaften, 1986, *Flood Routing Analysis for Failure of Mackay Dam*, Idaho National Engineering Laboratory, EGG-EP-7184, June 1986.

MCP-62, January 2002, "Waste Generator Services—Low-Level Waste Management," Revision 3, *Manual 17-Waste Management*, Environmental Protection and Compliance.

MCP-227, August 2001, "Sampling and Analysis Process for CERCLA and D&D&D Activities," Rev. 8, *Manual 18-Closure Management*," Environmental Restoration.

MCP-540, March 2001, "Documenting the Safety Category of Structures, Systems, and Components," Rev. 13, *Manual 10A - Engineering and Research,* Quality.

MCP-3480, June 2001, "Environmental Instructions for Facilities, Processes, Materials, and Equipment," Rev. 6, *Manual 8 - Environmental Protection and Compliance*, Environmental Protection and Compliance.

ORTEC, 1999, *User's Manual for the ISO-CART System*.

Ostenaa, D. A., D. R. Levish, R. E. Klinger, and D. R. H. O'Connell, 1999, *Phase 2 Paleohydrologic and Geomorphic Studies for the Assessment of Flood Risk for Idaho National Engineering and Environmental Laboratory, Idaho*, Geophysics, Paleohydrology, and Seisnotectonics Group, Technical Service Center, Bureau of Reclamation, Report 99-7, September 1999.

PLN-694, November 2000, "Environmental Restoration Project Management Plan," Revision 0, *Manual 7-Project Management*, Environmental Restoration.

PLN-804, "Project Execution Plan for Waste Area Group 4," Environmental Restoration.

PRD-25, June 1999, "Activity Level Hazard Identification, Analysis, and Control," Revision 2, *Manual 14 - Safety and Health—Occupational Safety and Fire Protection,* Safety and Fire Protection.

PRD-183, July 2000, "INEEL Radiological Control Manual," Rev. 6, *Manual 15 - Radiological Control*, Radiation Protection.

STD-101, September 2001, "Integrated Work Control Process," Revision 12, *Manual 16 - Maintenance,* Maintenance.

USGS, 1998, Preliminary Water-Surface Elevations and Boundary of the 100-Year Peak Flow in the Big Lost River at the Idaho National Engineering and Environmental Laboratory, Idaho, United States Geological Survey, Water-Resources Investigation Report 98-4065.